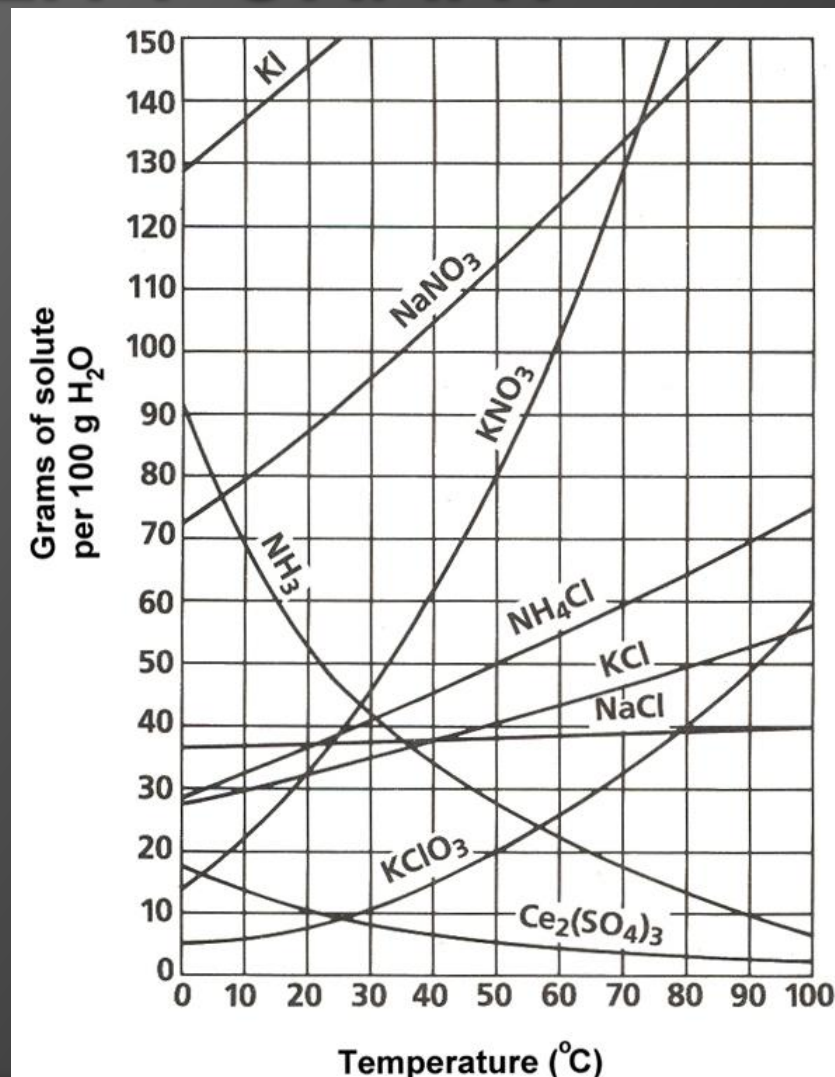


# GENERAL CHEMISTRY

## STANDARD 10.4

**10.4: Calculate how many grams of a solute are needed to make a saturated solution**

# SOLUBILITY CHART



Note the units of grams of solute per 100 grams of water on the y-axis

Note the unit of temperature in °C on the x-axis

10.4: Calculate how many grams of a solute are needed to make a saturated solution

# EXAMPLES

- What mass of sodium nitrate is needed to make a saturated 100. mL solution at 10°C?
  - First, find the solubility of sodium nitrate at 10°C
    - From the solubility graph, it is around 80 grams  $\text{NaNO}_3$  per 100 g water
    - So, to make a saturated 100. mL solution, you need 80 g  $\text{NaNO}_3$  at 10°C
- What mass of sodium nitrate is needed to make a saturated 200. mL solution at 10°C?
  - Start by dividing your desired solution volume by 100. mL – results in 2
    - Multiply the solubility of the compound by 2
    - Results in 160. g  $\text{NaNO}_3$  needed
- What mass of potassium nitrate is needed to make a saturated 150. mL solution at 60°C?
  - Solubility = 102 g / 100 g water
  - Use a proportion:  $102 \text{ g KNO}_3 / 100 \text{ g water} = X \text{ g KNO}_3 / 150 \text{ g water}$
  - $X = 147 \text{ g KNO}_3$

# TRY IT YOURSELF

- What mass of ammonia is needed to make a saturated 50. mL solution at 65°C?
- What mass of sodium chloride is needed to make a saturated 350. mL solution at 20°C?
- What mass of ammonium chloride is needed to make a saturated 500. mL solution at 60°C?
- What mass of potassium iodide is needed to make a saturated 25 mL solution at 10°C?

# TRY IT YOURSELF SOLUTIONS

- What mass of ammonia is needed to make a saturated 50. mL solution at 65°C?

**10 g NH<sub>3</sub>**

- What mass of sodium chloride is needed to make a saturated 350. mL solution at 20°C?

**126 g NaCl**

- What mass of ammonium chloride is needed to make a saturated 500. mL solution at 60°C?

**275 g NH<sub>4</sub>Cl**

- What mass of potassium iodide is needed to make a saturated 25 mL solution at 10°C?

**34.5 g KI**